

DE-AS 2,542,338 B2

Code: 1505-77304

FEDERAL REPUBLIC OF GERMANY  
GERMAN PATENT OFFICE  
PATENT NO. 25 42 338 B2  
(Auslegeschrift)

Int. Cl. <sup>2</sup> :	A 61 K 7/11
Filing No.:	P 25 42 338.5-43
Filing Date:	September 23, 1975
Date Laid Open to Public Inspection:	March 24, 1977
Publication Date:	June 26, 1980

AGENT FOR HOLDING A HAIRSTYLE

Inventors:	Paul Gross 6100 Darmstadt  Dieter Hoch 6102 Phungstadt
Applicant:	Wella AG 6100 Darmstadt
Publications considered in determining patentability:	DE-AS 14 67 859 US 28 40 087

Claims

1. An agent for holding a hairstyle based on a silicon compound, which is characterized by the fact that it consists of an aqueous or aqueous alcohol solution of 0.1 to 4.0 percent by weight of an inorganic silicate or an organic silicate of the general formula



in which

X is an alkali metal or the residue  $NR_1R_2R_3R_4$  and  $R_1$  to  $R_4$  mean the groups alkyl and/or hydroxyalkyl,

Y is a number from 0.5 to 4

Z is a number from 0 to 15,

and the usual additives.

2. An agent as in Claim 1, which is characterized by the fact that it contains methyltriethanolammonium silicate, tetraethanolammonium silicate, or dimethyldipropanolammonium silicate.

3. An agent as in Claim 1 and 2, which is characterized by the fact that it contains sodium silicate, potassium silicate or sodium-potassium silicate.

Agents for holding hairstyles usually consist of solutions of natural or synthetic or film-forming polymers. Possibilities as natural polymers are, for example, shellac, alginates, gelatins, pectins and cellulose derivatives. Synthetic polymers that are used include polyvinylpyrrolidone, polyvinyl acetate, polyacrylic compounds like acrylic acid or methacrylic acid polymers, basic polymers of esters of these two acids with amino alcohols, polyacrylonitrile and the corresponding copolymers of these compounds, for example polyvinylpyrrolidone-vinyl acetate.

These agents are effective in that they form a coherent film on the individual hairs and in this way increase the strength of the hairs like a in corset. As a consequence of this, it is now considerably easier to put the hairs into the desired form and to achieve a consolidated hairstyle with longer holding capacity. In any case, these agents exhibit various disadvantages which become apparent in the finished hairstyle both as they are used as well as later. For instance, these agents tend to leave behind sticky residues on the hands when they are applied to the hair. Moreover, after the resin film has dried on the hair, resin particles form an annoying dust when the hair is subsequently combed or brushed.

Furthermore, it turned out that these agents are also extremely sensitive to higher atmospheric humidity. Thus, in wet weather, the resin film on the hair becomes slightly sticky, so that the durability of the hairstyle is lost.

There have also been attempts to achieve stability of hairstyles and thus to prolong their durability with other agents. As is known, the durability of the hairstyle is also dependent on the state of the hair surface, namely the frictional resistance of the individual hairs among themselves. Hairs with a smooth surface have a considerably lower frictional resistance among themselves, which has as a result that the hairstyle is less durable and falls apart after only a short time. However, if the hairs are superficially rough, the frictional resistance of the individual hairs among themselves is increased and in this way the reciprocal support of the hairs is improved. The hair can now easily be put into the desired hairstyle, which remains stable even over a lengthy period of time.

Alkali solutions of mercapto compounds in combination with a subsequent oxidative rinse of the hair have already been used as agents that have a roughening effect on the hair

surface. In addition, the use of aromatic peracids to achieve a consolidation of the hairstyle through such an oxidative treatment of the hair has already been described. However, as a consequence of their chemical action on the hair surface, irreversible damage to the hair is unavoidable with these agents.

That is why the use of hair fixatives that contain submicroscopically finely divided silicon dioxide or aluminum III oxide has already been recommended. However, these agents cannot be entirely satisfactory, since the hair loses its sheen to a certain extent and acquires a somewhat dull feel. Finally, two-component hair fixatives have also been used, in which precipitation of silica or aluminum hydroxide in combination with a hair cosmetic polymer onto the hair is produced when the two components are mixed. Although this does allow an improvement of the durability of the hairstyle to be achieved, these agents have the disadvantages mentioned above, which result from the necessary content of polymer.

As has been surprisingly found, the said disadvantages can largely be avoided and hairstyles with excellent durability can be obtained through the agents in accordance with this application. The agents give rise to a superficial roughening of the hairs without chemical action, so that no damage to the hair results. Since they do not contain any polymers, hairstyles produced with them are extremely resistant to atmospheric humidity. The disadvantages of the formation of resin particle powder in combing or brushing as well as sticky residues in treatment are likewise not present. In addition, important cosmetic properties of the hair such as their natural gloss and feel are not adversely affected through the claimed agents.

The agents in accordance with the invention are characterized by the fact that they consist of an aqueous or aqueous alcohol solution of 0.1 to 4.0 percent by weight of an inorganic silicate or an organic silicate of the general formula



in which

X is an alkali metal or the residue  $NR_1R_2R_3R_4$  and  $R_1$  to  $R_4$  mean alkyl and/or hydroxyalkyl groups,

Y is a number from 0.5 to 4,

Z is a number from 0 to 15,

and conventional additives.

Possibilities as inorganic silicate here are a salt of the class of the alkali silicates, especially sodium silicates, potassium silicate or the double salt sodium-potassium silicate. Of the organic silicates that are quaternary ammonium silicates, one should mention for example methyltriethanolammonium silicate, tetraethanolammonium silicate and dimethyldipropanolammonium silicate. As was found in the use of the agents, with the said

inorganic silicates, a similar effect is obtained to that of the said organic silicates, but the effect is much more highly pronounced with the latter.

The preparation form of the agents according to this application is an aqueous or aqueous alcohol solution, where the usual representatives of this class of compounds for hair cosmetic preparations, namely ethanol and isopropanol, should be used as the alcohol. The content of silicate in the agents is expediently in the range of 0.1-4.0%, preferably a concentration of 0.2-1.5%.

Of course, the agents can also contain the normal and usual cosmetic additives such as, for example, perfume oils, bactericidal and fungicidal substances, direct dyes, substances to improve combability and others, but it is a prerequisite that these additives be chemically indifferent to the silicates.

The use of the agents in accordance with the invention as hair fixatives (hair setting agents) takes place in the conventional and usual way for these agents, by distributing about 20 ml of the agent to the washed and towel-dried hair, setting the hair and drying it. The agents in accordance with the application can also be used as setting hair tonics. Likewise, it is possible to use these agents in aerosol form in a mixture with conventional propellant gases.

Removal of the agents from the hair does not present any problems, since they can be removed from the hair without residue by conventional washing of the hair with a shampoo based on known detergent based materials.

## Examples

### Example 1

#### Hair Fixative

1.0 g aqueous methyltrimethanolammonium silicate solution (45%)  
99.0 g demineralized water.  
 100.0 g

### Example 2

#### Hair Fixative

1.0 g aqueous sodium silicate solution (58%)  
99.0 g demineralized water.  
 100.0 g

### Example 3

#### Hair Fixative

0.8 g tetraethanolammonium silicate

0.1 g polyethylene glycol (molecular weight about 400)  
40.0 g ethanol  
59.1 g demineralized water  
100.0 g

#### Example 4

##### Hair Fixative with Bactericidal Action

1.0 g aqueous methyltriethanolammonium silicate solution (45%)  
0.1 g chloracetamide  
98.9 g demineralized water  
100.0 g

#### Example 5

##### Tinting Hair Fixative

0.7 g tetraethanolammonium silicate  
0.1 g 2-nitro-1,4-diaminobenzene hydrochloride  
50.0 g isopropanol  
49.2 demineralized water  
100.0 g

#### Example 6

##### Hair Fixative

0.5 g dimethyldipropanolammonium silicate  
50.0 g ethanol  
49.5 demineralized water  
100.0 g

#### Example 7

##### Setting Hair Tonic

1.0 g aqueous methyltriethanolammonium silicate solution (45%)  
50.0 g ethanol  
0.1 g methanol  
48.9 demineralized water  
100.0 g

Example 8

## Hair Fixative

100 g aqueous methyltriethanolammonium silicate solution (45%)

50.00 g isopropanol

0.03 g citric acid

48.97 g demineralized water

100.0 g

All of the percentage figures given in the application are percents by weight.